

The Triathlon Summit - How to Take Your Swimming to the Next Level and Save a TON of Your Energy for the Bike and Run

KERRY: I am Kerry Sullivan and we are here with the TriathlonSummit.com. This evening we have Terry Laughlin on the line who is the founder of Total Immersion. I'm just going to give Terry a little bit of an introduction here. Terry was a swimmer for most of his life, a collegiate swimmer, and then after graduating college he went on to become a head coach at the ripe age of 21. From there as 16 years as a collegiate coach, his athletes won 14 individual and relay titles at NCAA Division III, National YMCA and US Junior National Championships. Every team that he coached performed far better than they had before. He also helped some swimmers qualify for the Olympic trials in 1980, '84 and '88 and produced a number of world-ranked swimmers as well. From there he went on, took his experiences and what he learned and he developed Total Immersion. With that, let's bring Terry Laughlin to the line. How are you doing Terry?

TERRY: I'm super, Kerry. It's good to be here.

KERRY: Good, good. We're very happy to have you here. Let's start off asking you some questions. How did you start Total Immersion?

TERRY: Actually, you mentioned my swimming background, I was a pretty undistinguished swimmer. The first time I tried out for a swim team was in eighth grade and I didn't make the team. I was the only person I think they ever cut from that team. Then I swam in high school without any particular distinction. In college I did a little better as a distance swimmer.

When I went into coaching I had this sense that hard work might not be the only answer to swimming well. I was always a coach that was pretty oriented to teaching and really drawn to the aesthetic part of the stroke, in other words while other coaches were focused on the pace clock I was really fascinated by how people's swimming looked and associated performance more with a certain look in the stroke and worked more on trying to make people look like the swimmers that I was either coaching or had seen.

I had coached from 1972-1988 with a real teaching orientation. Then in 1988 I was feeling a little burned out, not from the coaching but from dealing with swim parents. I decided I was going to offer a camp for adults the summer of 1989. I did that because not too many other people were focusing on that. There were a lot of camps for kids but I didn't see much offered for adults. I thought that in a camp setting I could really do the part of coaching that I liked a lot, which was to teach. So the first Total Immersion Camp was kind of like a summer camp for adults in July of 1989. I had six people come to it and they were all master swimmers. We taught all the strokes and everything and I enjoyed that. Then I did another

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camp the following week and I had about the same number and so on.

So that was the start, I just had the two camps in 1989. Then I wasn't coaching -- no, excuse me, I was coaching at West Point. I was an assistant coach with the swim team at West Point during that time. Then in the summer of 1990 I did a few more camps. There really wasn't any Total Immersion in between the summer of '89 and the summer of '90 but I did a few more camps in the summer of 1990.

In 1990 I got a few triathlete for the first time and over the next couple of years we started to see more triathletes at the camp. That really was a challenge to me, for a couple of reasons. First of all they mainly wanted to work on freestyle. They weren't all that interested in the other strokes and I had my heart set on teaching all the strokes. The second reason was that when we finished a pool session they ran outside, got on their bikes and went for a bike ride and they would come back for the next pool session with their tongues hanging out. So I wasn't thrilled, in the beginning, with having triathletes come to camp. It was kind of changing from what I thought I wanted to be doing there.

As the sport grew in popularity in the 90s and I started to see a lot more triathletes it became really evident that the greatest appetite was for programs to focus on freestyle. Two things happened that really led to what Total Immersion eventually became. We started to offer freestyle-only programs and eventually stopped doing programs for the other strokes because there just wasn't as much of a call for that. We still occasionally do have programs, camps and so on where we teach the other strokes but 98 percent of our workshops and so on are really focused on freestyle. So we became a program that focused very heavily on teaching freestyle.

The second thing was I was really so much more challenged by coaching triathletes and teaching triathletes because the master swimmers that had come initially were people just like me. They had been swimming since childhood and they were pretty comfortable in the water. They had a reasonable base of skill and self-awareness in the water, whereas triathletes were really uncomfortable, they had very little experience in swimming and the stuff that I was used to using with swimmers, the drills and so on that I had done for almost 20 years at that point, as a coach, were not working as well. So I was forced to find some new ways of teaching. It was really absolutely non-negotiable that we had to spend time with getting them comfortable in the water.

From that point I started developing a new way of teaching that was based on having people... I guess the best way to put it is develop a relationship with the water before worrying about locomotion, in other words before

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worrying about getting to that end of the pool, to think about just issues like, “I really hate this feeling that I’m sinking” and things like that. So we ended up coming up with a different way of teaching swimming that really inverted what was the traditional way and really down-played pulling and kicking in favor of first getting comfortable, which in a more formal way we call balance. And then a focus on reducing drag, being more streamlined and more aligned. So a lot of body position things, with pulling and kicking only being introduced when they were comfortable in the water, when they were aligned, when they were balanced, when they were a little more stable.

The upshot of that was that when we started teaching in this new way, where locomotion became secondary to body position and drag avoidance and so on, the progress shown by the people we were teaching was just unprecedented. I have not ever seen swimmers progress-- [audio stops]

KERRY: Hello? [audio problems] OK, I guess we’ll continue on to the next question. I’m not exactly sure what happened there. We’re back in action now.

TERRY: What was going on was we were seeing such remarkable improvements, something we’d never seen before in our coaching experience, that I ended up writing a book describing what it was. That was the Total Immersion book. It’s gone on to become the bestselling book on swimming in the world. So that’s how Total Immersion started.

KERRY: Yeah, you’ve gone global. Good stuff. All right, let’s get into the first question here that we have for you. What’s the relative importance of technique versus conditioning in swimming?

TERRY: I think what we’re seeing in the camps that was really so surprising to us, the improvement was so great that it was an indication of something. It convinced me that technique was really far more important because these people that I was working with were all highly conditioned athletes. They were triathletes when they came in and they were swimming very poorly and they had no “endurance” in the water. When we taught them changes in their technique it made a huge difference.

I didn’t really fully understand the significance of technique in swimming, actually I’ve been teaching it for many years but then last year at this time there was an article in “Popular Mechanics” and it talked about a group of physicists and engineers who were given a project by the Defense Department to design a swim foil for the Navy Seals. In the course of their research for that they found out that human swimmers, on average, are three percent efficient. In other words, 97 percent of our horsepower and energy get diverted into something other than forward propulsion. Even

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for elite swimmers, Michael Phelps is only not quite 10 percent energy efficient. So even he's wasting over 90 percent. That's just a mind-boggling number. To realize that while you're working on fitness well over 90 percent is going to waste when you're in the pool.

So when I saw that article I did a web search. I just typed the search term 'energy efficiency in' and then I put in all the land sports - running and cycling and cross country skiing and so on. The range of energy efficiency among elite athletes in those sports was between about 23 and 36 percent, as compared to less than 10 percent for the elite swimmers. But what was even more striking was the differential between the recreational athlete and elite in the land sports was only 10 to 20 percent, whereas the differential between the recreational athlete and elite athletes in swimming, in energy efficiency, was 300 percent. So that was a big, big thing, to see that number.

It's clear that the solution to swimming well, when you understand those numbers, is not getting fitter. What it really is is reducing energy waste. Reducing energy waste, that's what technique is. That's significant.

KERRY: Oh yeah, that's huge. So then how important is drag reduction as compared to propulsion in swimming?

TERRY: That ends up being the main issue when you consider what's the reason why we're wasting 97 percent of energy. I would guess that most new triathletes are probably in that three percent range. So if Michael Phelps is nine percent, a new triathlete who's got no swimming experience at all is probably in the three percent, maybe four percent range. When they get to the point where they can actually swim a mile non-stop, they probably raised their efficiency to maybe five percent or so.

So the things that are to blame for that waste, there are several causes. One is the fact that we're sinking. One is the fact that we're unstable, the fact that we have very poor traction. We try to push on the water and it just swirls away. But the main one is that water's about 1,000 times denser than air is. When you start thinking about anything that moves fast through either of those mediums, even in "thin air," if you're designing something that needs to move fast, like a bullet or a sphere or a bullet train, it's really streamlined. Triathletes know that. That's the reason for aero bars and aero positions and so on because our velocity on a bicycle is significantly greater than it is while running, that they spend a lot of money to reduce drag on a bicycle. And that's thin air.

Once you get into a medium that's 1,000 times denser it really should become very, very obvious that drag avoidance is a huge issue. What this really comes down to is if you think about the average person who's

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standing at the starting line of the race, or who's just standing at the end of the pool and wanting to get from this end to that end, what's going through their mind? Are they thinking about avoiding drag in the next period, whether it's the next 20 seconds or between 15 minutes and 2 hours and 5 minutes that they'll be swimming? During how much of an Iron Man swim do you suppose the average person is really aware of drag avoidance, versus pulling and kicking?

KERRY: Probably very little.

TERRY: There's not much thought given to that. Our instincts are so strong on the pulling and kicking side. That's the big, eye-opening insight that I think is really critical for triathletes. One way of looking at this and understanding why humans experience so much difficulty in swimming is to think about the difference between anything that is designed to move through those mediums fast. So basically the fuselage shape is the one that has been designed for speed in air or water. A human body is really shaped nothing like that. A fuselage has a tapered leading edge and what follows it is smooth and sleek. The human body is all angles, a head that moves around and arms and legs that stick out and hips and shoulders. As soon as you start moving, especially if you're uncomfortable in the water and you're a little prone to doing what I call "survival stroking" it's just massive bubbles of turbulence and waste being created and so on and not a lot of locomotion.

What we've started to do in teaching is to get people to be thinking in a concept that will seem very strange at the outset but makes a lot of sense in a fluid medium, is that the more important role of your hand is to separate water molecules gradually. That's what the tip of a fuselage does, it separates molecules gradually so that the rest of it can go through smoothly. What it boils down to, there's an awful lot of detail beyond that but the technique that we're trying to get people to adopt is to focus more on separating the water molecules in than pushing on those behind you.

That's drag reduction versus propulsion. You still do the propelling part but it's a case of what are you going to be thinking a little bit more about while you're swimming.

KERRY: Yeah. That's great stuff. If you guys want to get some more information on some of these techniques and things like that, obviously Terry's site is a great resource for that. That's at totalimmersion.net. In particular for triathletes, he just came out with a great new DVD called "Outside the Box - A Total Immersion program for success in open water." You can get that at totalimmersion.net, right Terry?

TERRY: That's right.

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KERRY: Great, great. The next question that I'm going to ask you is, in terms of relaxation when you're swimming, how important is that?

TERRY: I've been swimming open water for 30 years myself. I'm 57 now. I happened to have mentioned earlier that when I was in my teens and 20s I really was not very successful, you might say I was an underachiever. At the time I was really focused, dedicated to being the hardest working swimmer in the pool. Any time I was in workout I was really determined to out-work everybody around me, to be the first one in the pool and the last one out and so on, never missed a workout. I got out of every one with my tongue hanging out. Yet I experienced very little success.

When I started coaching in my 20s, especially because I was on deck and getting to watch from on-deck instead of just being in the water in a haze of pain all the time, I became more aware of the importance of technique and began to understand it better. As I taught it I understood it better and certainly I practiced all that on myself. So in my 20s and 30s I was really focused on becoming a technically better swimmer. In my 40s I took that to a somewhat new level and I was really focused on overall mastery as a swimmer, not just better technique but really more self-awareness.

When I got into my 50s, I'm 57 now, as I said, when I moved into my 50s, you become a little bit more aware of your physical limitations, in cases you become a lot more aware of your physical limitations as you move into middle age. I really started to think a lot more about relaxation. It was something I hadn't given very much thought to when I was younger.

I'll give you some of the specific instances of relaxation. It's a general term but you should really be thinking about relaxing specific things. One of the things is we've always taught the importance of head position and we told people to put their head in line with their spine and put their head so they're looking down and put their head so it's mostly under water. Once I got into my 50s I started to think of it and describe it differently. I began to think about and teach people to just release your head. When you're swimming just completely relax the muscles that you normally use to hold it up. Something that seemingly simple can be difficult for people because they've spent lots and lots of time holding the head in a certain position. At some point you're not even aware that there's a certain degree of tension. So it can actually take people a long time to relax the head into position.

Another thing that we have only realized in the last couple of years that turns out to be a really consequential issue is, what do you do with your hand. I think we were all taught, back in our Red Cross lessons and on swim teams and so on, the importance of holding water and the

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importance of pushing water. How do you hold your hand when you want to hold water? Well, first we were taught to cup it and then we were taught to turn it into a paddle and so on. No matter what in every instance what you're talking about is having a stiff hand. As we were teaching and we were watching a lot of video of swimmers who were unskilled and inefficient, we started to see a real pattern which was whenever someone had a stiff hand -- and how you can tell it's a stiff hand is really simple. Are the fingers held together? If the fingers are held together and the hand is stiff, almost without exception as they extended it forward, as they reached out and extended it forward, the hand would scoop up and as the hand scooped up, every single time the feet dropped. So it was kind of like the hand, the leading edge, as the arm went forward, if the hand was stiff then the arm became like the front end of a kite. If the front end of a kite catches the wind the tail drops. The water that you're moving through was acting like the wind that the kite is going through. So a stiff hand was actually causing people's feet to drop.

As soon as they relaxed the hand and the hand would just sort of drop, two things happened that were really beneficial. One is that the feet would come up and they wouldn't have to kick as much, obviously that's beneficial. It's beneficial because there's less drag when the feet come up and it's beneficial because if you kick less you're saving energy and you're also creating less turbulence. But the other thing was when the hand was dropping into a position where the fingers were down and the palm was back, well then the first time they put any pressure on the water the resultant force was moving them forward, whereas a stiff hand would have the arm straight, or flat, in front of you and the palm down and the first pressure would move you upward instead.

Those were significant insights. From there it became a little more subtle for me in exploring my own swimming. I started working with trying to figure out how light could be the pressure I applied to the water and yet not lose speed. So it moved from a general focus on relaxation to very specific instances of muscles that if you relax them, you would actually gain a benefit.

So from that point we've gone to really looking at the whole body and every movement that happens in the course of the stroke and trying to figure out what are the muscles that people typically activate that are not productive. In other words, maybe they're even hurting your body position. Maybe, as in all the instances I gave, turning on muscles not only creates some fatigue in those muscles but it hurts your body position.

Relaxation can be sort of a vague topic and I think everyone understands that we perform better athletically when we're relaxed than when we're tense, but when you take it down to the details of swimming, there are

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some very consequential aspects of relaxation that actually make you a better swimmer. They not only save you energy but they improve your ability to be efficient in the stroke.

KERRY: Awesome. Great stuff. A lot of triathletes they don't like spending a lot of time in the pool. They often have limited time so they're looking to get the most bang for their buck when they're actually doing swimming. How can a triathlete improve swimming performance with limited training time?

TERRY: That's a particularly important question for triathletes because they do have to make time for three sports, as well as life. There is a strong culture in triathlons about the training log and making sure you're doing as much training as the next guy and so on. It's obviously not just triathlon but being fit, being conditioned, being ready for the task, is something that is really important in swimming as well.

One of the things I always say to swimmers is they don't give medals for the best VO2 Max. We get awarded for performance and performance is really a function of doing movements that are effective. If you're thinking of, "Am I getting enough time in the pool? Am I doing enough slumming?" I think there are a few guidelines I can offer to sort of clear up that subject.

The first is to redefine endurance. Endurance we think of as the capacity to do work, we think of it in a physiological sense. I kind of define endurance for swimming as the ability to repeat effective swimming movements, effective strokes, and to do that for a duration of your choosing, to do that at a rate of your choosing. That rate could be a stroke rate or a heart rate or whatever. It's a very specific task. That means not just physiological or aerobic endurance but it also means muscular endurance. It means that your nervous system must be trained well to repeat the movement patterns that are effective and to have those not break down.

I'm a really serious open water swimmer. While I was pretty much an underachiever in my youth, since turning 55 I've won multiple national master's championships. I broke two national records in the one-mile and two-mile. Cable swims I was the top ranked long-distance swimmer in my age group in 2006 and 2007. I have learned, in my 50s, that the muscular endurance I just spoke about, as well as mental endurance, are just as important to me as the physiological or aerobic endurance. When I say mental endurance it means that if I'm swimming two miles in open water when I broke the record I was swimming for 46 minutes, the duration of the two-mile race, when I broke the record it was 46 minutes and 20 seconds. I can tell you during the 46 minutes and 20 seconds I never got distracted one moment. I was probably taking somewhere between 60 and 65 strokes a minute for 46 minutes. That's 2600 or 2700 strokes,

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something like that. Not for one stroke did I ever, ever let my mind wander away from the stroke I was taking in that moment.

When we go back to that realization of what I said, which is that humans are catastrophically inefficient in the water and that almost nothing we do instinctively or naturally is good and almost everything that solves our efficiency problem is counter-intuitive, non-instinctive, you start to realize the importance of being really attentive and mindful to the details of your stroke while you're swimming.

So when I'm training I'm not just training for aerobic endurance I'm far more likely to be thinking about and visualizing -- and this will sound a little whacky but it's totally true. When I'm out on a lake, and I do for five months of the year between mid-May and mid-October, I don't swim in a pool and I don't have use a pace clock and I do every bit of my swimming in a lake, so I'm not doing any timed intervals. One of the things that lake swimming and open water swimming promotes, when you take away the walls, you take away the pace clocks, you take away all the stuff that's normally there in the pool, what you're left with is your own stroke and your own sensations. So I've found myself often while out in the middle of the lake working on one fairly subtle detail of my stroke. Just the sense of having my hand tipped in a certain way and my elbow lifted in a certain way at the beginning of the stroke and feeling the water resist my hand and form in that moment, and as I'm doing that I'm taking 300, 400, 500 uninterrupted strokes, because here are no walls, I just find myself drawn to this image of signals going along the wiring of my nervous system and going to a specific muscle and activating that muscle over and over and over until my nervous system really, really knows that movement.

So this is kind of a long-winded way of saying that I've devoted so much time to training my nervous system and devoted so much time to training my mind to stay focused on these little details that I've learned are consequential to whether I'm efficient or inefficient that my sense of endurance is much broader than it used to be. I realized that I can accomplish so much more in a limited amount of training time by thinking more broadly about endurance and not just thinking about aerobic endurance.

KERRY: All right, very interesting. Here's another topic that you hear a lot of different things on, that has to do with kicking. As triathletes we're told, "Don't kick, you'll burn your legs out." Some people say, "Kick a bunch." "Do an eight-beat kick." Some say a two-beat kick. Some say don't kick at all. What's your opinion on that and where do you stand on that?

TERRY: I'm going to try to give a less-long-winded answer than the last one. I'll start by saying something really direct and specific. The first thing you

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should be thinking about, with regard to your kick, and this goes back to that idea of being aware of drag, constantly aware of drag. The first thing you should think about with your kick is how to move your legs and how to hold your legs so that they create less drag. It's instinctive that when you're thinking about kicking you're thinking about to propel. If you're on a kickboard, which I would say never, ever do, it's the biggest waste of time, not until they start offering triathlon races where you've got to kick 400 meters before you get on your bike, which they're not going to do. Until they do that kicking on a kick board is a waste of time.

Think first about streamlining your legs. It's the very first thing. The second thing is it's really important to find a way to relax your legs. We go back to that concept of relaxation. In this case it means to make your legs more passive. Here what I'm talking about is what is so common among new swimmers and people who are taking up triathlon or have been runners and never swam before, they get in the pool, they feel like they're sinking and the first thing that happens is their legs just start churning. It's not that they want to kick, it's they don't feel they can't kick. If they don't kick they're going to sink. So the legs start churning. It is so critical to your success as a long-distance open water swimmer and your ability to get out of the water feeling fresh and have good, fresh legs when you get on the bike that you be able to have relatively passive legs in the pool.

When we're teaching people how to kick so that they're kick is beneficial and efficient and economical, we actually have them do a drill we call Superman Glide where in a shallow section they repeatedly push off the bottom, extend their arms forward, shoulder width, and simply glide. What they're trying to do is feel, even if it's brief, to feel a moment of support that tells their brain something different. What they're used to hearing from their brain is, "If I don't kick I might drown." We need to interrupt that signal and replace it with a signal that says, "Kick. I'm OK." So they do the Superman Glide and they feel a moment of support and they start to let it relax a little bit. You've got to break the cycle of what I call 'busy legs' and let the legs be a little more passive.

Then at some point beyond that you gain the ability, after swimming for a while with passive legs that do not have this habit of churning, that are not creating all this drag, by swimming for a while with legs that are passive, you break that cycle and you then will have a chance, after a while, to start developing a coordinated two-beat kick. But it starts with, number one, being more conscious of streamlining the legs and number two of developing the balance and the sense of support, almost weightlessness, where you can have a relaxed, passive leg movement that's non-overt.

KERRY: All right. OK. With that I'm going to ask you this, with triathletes we're

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swimming in open water. How much of a difference is there in technique or strategy between swimming in a triathlons versus swimming in a pool, maybe a 100-meter race in a pool or something like that?

TERRY: Huge. A huge difference. I've been swimming in open water since I was in my 20s, so I started around 1973. I was an ocean lifeguard on Long Island. I went to lifeguard tournaments and started swimming ocean races 34, 35 years ago. I noticed early on that I was more successful in open water races than I was in the pool. People that typically beat me in the pool I could either be competitive with them or even beat them when I got on open water. I started to think of myself as an open water specialist.

Then as I moved into my 50s I started to set some higher goals. I moved into my 50s and I was sort of on the verge of being in the race to win a national championship. I finished second a couple of times but I'd never won. I really wanted to raise my level and I wanted to be a national champion. I was so close I could almost taste it. I started to realize that if I was going to have any chance of actually being a national champion and doing these things that I've done since turning 55, it was not going to happen for me in the pool but I really had a shot in open water.

So I started practicing differently. I had been swimming masters for quite a few years and I was swimming with a local group of masters. I started to swim every practice repeat thinking about open water that might be months in the future. What I mean by differently from what other people were doing or distinguished from what other people were doing, was that if we were swimming say 25s, and there were quite a few triathletes swimming with the group, if we were swimming 25s everybody would sprint the 25s. By sprint I mean the stroke rate, really aggressive arm turnovers and so on. they would just tear off and I would swim the way I would swim in the faster part of an open swim, which is a longer stroke, a controlled stroke, things that felt sustainable yet the fastest I could swim. So if they were taking 21 strokes on a 25 I was still limiting myself to 14 or 15 and just challenging myself to swim as fast as I could at 14 strokes, as fast as I could at 15 strokes. When I did that I would be slow by pool standards, but I wasn't worried about that. I was committed to being fast in an open water context, to constantly patterning myself, constantly programming myself for the kind of stroke that I knew by experience worked well in open water. So I continued to do that and to some extent I felt like I was limiting myself as a pool swimmer but it brought my increased experience in open water. I was convinced I was really onto something.

Then two years ago Jonty Skinner, who's the performance science director for USA Swimming, he wrote an article on the USA Swimming website. If any of you listeners want to read that article, if you go to the USA

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Swimming website and look at the articles section you can find that article, but also if you go to our website and you look in the archives of our magazine, I've written an article about the open water technique which drew from Jonty's article.

Here's what Jonty's article talked about. He had done a study of swimmers that were really successful in 25-yard pools. All through the winter USA Swimming races in 25-yard pools and then in the summer the races are in 50-meter pools. He found that there were quite a few swimmers that were very fast in 25-yard pools didn't do well in long-course, in 50-meter pools. When he studied them he found that they swam differently. The people who were successful in 25-yard pools had an aggressive, high-rate, arm-based stroke. There was a lot of force in the arm stroke and a high turn over and not a lot of body rotation. The swimmers who were more successful in 50-meter pools were people who had a longer stroke, more body rotation, it was more of a core-based stroke, there were lower arm forces but the stroke they had was producing a speed that was more sustainable.

Here's what was really striking to me in the article. He did an analysis of the difference between long-course swimming and short-course swimming. In a 25-yard pool the ratio of swimming to non-swimming, in other words when you turn and push off and glide - and you know from watching the Olympics that swimmers are spending a lot more time under water now with the dolphins and so on, and less time on the surface swimming - the ration between swimming and non-swimming in a 25-yard pool among elite athletes was 2.6:1. So they're actually spending a lot of time not swimming. the not-swimming portion allowed them to recover from the really physically-taxing stroke they were using on the surface. That stroke made them faster over short distances but they were also able to recover for a substantial part of these races.

In long-course that ratio went up to 7:1 or 8:1. So with so much less recovery it was evident that a different kind of stroke, longer stroke, more body rotation, more based on core power, less load on the arms and so on, was hugely advantageous when you ad your ratio of swimming to non-swimming from 2.6:1 to around 8:1.

Now you get in open water and what've you got? No rest. It's all swimming. So I saw that article and I thought, "Oh my god, what's true in long-course has to be dramatically true when you get in open water." So at that point I realized that for about five years I had, sort of unawares, been practicing the stroke that I recognized was advantageous in open water and then I saw this confirmation, this study done by, as I said, the performance science director for USA Swimming. So that's when I decided I needed to make a video. That's what this new video of ours,

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"Outside the Box" is about. It is about illustrating and exploring the techniques that you are probably not likely to do if you've been training in the pool. If you think about it, doesn't everybody do most of their swimming in a pool?

KERRY: Yeah.

TERRY: And aren't a lot of triathletes drawn to swim with masters teams and when they get in with the masters team are they not just being the good athletes, the dedicated athletes they are when the coach assigns 25s? They do their level best to race as well as they can on those 25s. Doesn't matter whether it's a 25 or a 500, being a devoted athlete they're going to give their best.

So what's happening when you're doing what you think is the right thing, doing the hard work that you think is the right thing, you're training yourself to have a stroke that's going to hurt you in open water. It becomes important to recognize the difference. There is a difference between a pool stroke, especially a 25-yard pool stroke - and most of us are swimming there - and a stroke that's going to help you in open water.

They're really different ways of swimming. It's not just an issue of having good technique. It's an issue of having an open water technique, that's what this video we just released is about. There's three parts. Part one explains the open water technique and how to develop it. You've got to work on it in the pool. to be really good in open water you have to be in the pool in the middle of November, in the middle of December, and thinking about a race you're going to swim in June in open water, be rehearsing for that race instead of racing through the repeat you're doing this minute in December in the pool.

KERRY: All right. Very interesting stuff. Like he said, he's got that new DVD you can check out on his website. We're actually getting a lot of questions coming in over the Internet here. Do you want to try answering a few?

TERRY: I'd love it.

KERRY: OK. Let's do that. We've got Fred Boans here in Southfield. He said, "My swimming has improved--"

TERRY: Southfield, Michigan?

KERRY: I'm not sure. It just says 'Southfield.' Maybe Michigan, possibly. Do you know him?

TERRY: No, no. I'm just curious. Like Click and Clack, they always want to know where you're from.

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KERRY: Yeah. He's from Southfield. I'm sure there's a few of those in America. He says, "My swimming is improving but I'm a sinker. Any extra advice there?"

TERRY: Yeah. I would recommend that he try that Superman Glide exercise that I did. Sinking is not bad. Sinking is what we're supposed to do. Our bodies are designed to sink. So actually trying to stay on top of the water is counter-productive because it leads to struggle. It definitely hurts you. Fish are under water, are they not? There's less strength below the surface. The human body, by body composition, is supposed to be 95 percent below the surface. So balance is really learning to sink in a horizontal position. That's what that Superman Glide drill that I described teaches you, how to sink in a horizontal position until you reach equilibrium, until you reach a place where you feel support. That's also taught in lesson one on our "Easy Freestyle" DVD. Doing balance drills and learning to sink horizontal instead of fighting gravity is a really important thing.

KERRY: All right. The next question we've got Mario from Chihuahua, Mexico.

TERRY: Hola Mario!

KERRY: There we go. His question is, "Is it better practice technique to apply your concepts only with no tools or a mixed technique with tools such as fins, kickboards and paddles?"

TERRY: I'm really not a fan of tools. The reason that I gave is probably if I go back to Fred's question about sinking and so on, fins and paddles and kickboards and all these things, think about it, what are they all focused on? They're all focused on number one, work. They're forms of work. They're just different forms of work. They're forms of work. They're forms of getting muscles strong and they're all about propulsion, aren't they? Is there anything about any of these tools that is about being aware of avoiding drag? I don't think so. If you go back to that awareness, and it's going back to base principles, an awareness of a base principle, such as the ones I started out with, swimmers are three percent efficient. Human swimmers are three percent efficient. The number one reason why they're three percent efficient is drag. If you go back to those base principles it will answer almost any question you have. Think about improving your efficiency. Think about reducing energy, energy waste. Think about reducing drag. You don't have enough time in your life to solve all these problems in the water, let alone wasting time going up and down the pool with fins and paddles and so forth.

KERRY: All right. That was Southfield, Michigan, by the way. That's what they're saying. They let me know. Next we've got Fred Goesch from Oakham,

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California.

TERRY: I know Fred Goesch!

KERRY: You know Fred?

TERRY: I know Fred Goesch. I've exchanged email with him.

KERRY: All right. Well, he's got a question for you. he's saying, "Terry, I'm an Iron Man. But it's hard to get in open water to train. how is it best to use a 25-yard pool for Iron Man training?"

TERRY: OK. Well I think that goes back to what I said before, is to recognize that when you're in a yard pool you don't want to train like a 25-yard swimmer like I described before. Certainly a yard pool or a meter pool is a great place to practice technique. It's a great place to practice and develop mental endurance by really focusing on your stroke. So it's developing the techniques of open water swimming. I can name a few of them here. they're illustrated on the video.

Number one is release your head. I talked about that earlier. You want to let your head go until it's in a neutral position. Number two is what I call 'wide tracks.' You want to make sure your arms never cross over in front, that as you extend your arms they should extend and pull back at shoulder width. If the arms cross over the center line it makes you less stable, side to side. Arms that stay wider are a little bit like outriggers and they make you more stable side to side, Number three among those techniques is what we call 'the mail slot entry.' You visualize a letter slot, the kind that the mailman puts the letter in in your front door, you visualize a mail slot in the water and you slip your hand cleanly into that slot in such a way that your forearm and elbow can go through that slot.

The fourth one is the idea that I mentioned before of keeping your legs streamlined and relatively passive. There's more to it than that. As I said, the "Easy Freestyle" video and the "Outside the Box" video both illustrate the specifics and a lot more details about how to develop them. but certainly the starting point is if you are in a 25-yard pool be thinking about how you want to swim in open water. You want to swim in open water and be working on those techniques.

KERRY: All right. We've got Hal from Bloomfield, Michigan. He says, "It seems that Total Immersion" concentrates so much on form that it gives up speed for efficiency. How do you increase speed using your technique?"

TERRY: Great question. I think about speed in two ways. When you're in that three percent, four percent, and maybe even five percent range of efficiency - I

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know that nobody out there is going to know exactly what their number is - but if you're still a developing swimmer most of the speed that you gain initially is going to come from what I call sustainability. By sustainability it means that a pace that you might be able to hold for 100 meters or 200 meters, as you increase your efficiency, as you decrease the energy cost that pace then becomes one you can extend to 200 meters to 400 meters to 800 meters to 1.5 K and so on. Sustainability, the ability to hold a given pace that used to tire you out after a short while and then being able to sustain that pace longer, that should always be the first place that more speed comes from.

The second place, and I would invite people to go to on site, after this talk to visit the Total Immersion site and read my blog from today, because I just put a blog up today about exactly this issue, which is using a tempo trainer. Once you have an efficient stroke to use a tempo trainer to incrementally increase the rate at which you take those strokes.

So I'll give you a real quick for instance using a tempo trainer. My training session yesterday was I did four 25s, four 50s, four 75s, four 100s, four 125s, that's five lengths of the pool, and then I did four 100s, four 75s, four 50s, and four 25s. I had a tempo trainer under my cap the whole time. I set the tempo trainer at 1.2 seconds, which means I was going to take a stroke every 1.2 seconds in response to a beep or synchronized to a beep that I heard beneath my cap from the tempo trainer. I simply maintained a constant stroke. I've spent a lot of years working on my stroke efficiency and my ability to maintain a constant count. I maintained a constant count of 13 strokes on the first lap of every repetition and 14 strokes thereafter. I did that for the 25 going up to the 125. As I came down, and the effect of that means that my pace per lap on the 125 was exactly the same as it was on the 25. I gave up no pace as the distance increased. So that is the sustainability side of speed. So the first half of that set I was working on the sustainability side of speed.

On the second half of the set, as I dropped from the 125s to the 100s, I increased the frequency of the beeps. I adjusted the temp trainer so it was now beeping every 1.19 seconds instead of every 1.2 seconds. It's a hundredth of a second. It's a tiny, tiny interval of time, but the great thing was if I took 13 strokes, 14 strokes, 14 strokes on that there was about 80 beeps or so in the course of a 100. So I was actually swimming a second faster just by changing it by a hundredth of a second, I swam my 100 a second faster, 80 beeps multiplied by 1/100 of a second. So learning to gradually adjust the rate at which you complete strokes of high efficiency is the second part of it.

Speed is a math problem. Very few people think about this. Virtually everybody thinks about speed as "I have to swim harder to go faster. In

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order to swim harder I have to be better so I have to work harder to swim harder to go faster." That's not it. Speed is a pure math problem. All right? It's the distance of a stroke multiplied by the rate by which you take them. So first establish the distance of your stroke, then use a tempo trainer to, in a methodical, systematic and controlled way, gradually, incrementally increase the rate at which you take them. It's simply a training thing. You're training your nervous system to be able to handle different rates. You do that on your bicycle with cadence meters and so on, you don't do it in the pool. You need to start doing it in the pool. If they read my blog from yesterday's training - I just posted it today - they'll see a really detailed account of how to do that in practice.

KERRY: OK. So one of the other questions that's coming up here a bit is, is there an ideal stroke count per 25 yards, or anything like that, that people should be aiming for?

TERRY: Yes. But it's not one for all. It really is a factor of your height, your arm length and so on. the most important thing is that the lowest count you use at any time should be no strain. By no strain I mean you're not extending yourself in an unnatural way. You're not kicking to get that low count and so on. Stroke count is really less important than just finding a way of swimming easily. As you find a way to swim easily, yes by all means count your strokes and use that as a cross reference and over time be committed to doing the changes in technique that allow you to swim with ease at a gradually lower stroke count. but don't obsess about getting a low count.

I have a formula for what's the optimal stroke count for a person of any height. I promise I will blog on that tomorrow. So if they go look at my blog I will put on my blog that formula by which anybody can measure their arm length and know what is the optimal low count for them.

KERRY: Excellent. I'm sure you'll have a lot of people checking that out. We're going to go with one more question. This is from Lewis in West Point. He says--

TERRY: He's the coach of the West Point Triathlon team.

KERRY: Is he?

TERRY: One of the best collegiate teams in the nation.

KERRY: Shout out to you. "Is there a simple way to dramatically show someone how to-- Sorry, let me read that over. I blew that. Is there a simple way to show someone the importance of drag reduction versus propulsion?"

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TERRY: Is there a way to show them the importance of drag reduction versus propulsion? Yeah. Here's a really simple way. Push off the wall and streamline and have someone time you with a push off and just swim like half way down the pool. Then do it without the push off, where you push off right on the surface and start stroking right away. So if you push off, hold your glide under water, break out, outside the flags, let's say you go five or six yards and then swim half way down or to the other end of the pool. Have someone time you. Then you'll have a combination of drag reduction and propulsion in the course of that swim. If you push off right on the surface and start stroking right away, it'll all be propulsion. Guaranteed the first way will be much faster. That's a really simple way to understand the difference.

I should put in a plug. Lew wrote a book chronicling the coaching he did with the West Point Tri Team called "The Over Achiever's Diary." It's an account of a full season of training by the West Point Triathlon Team with a particular emphasis on how they develop good swimmers.

KERRY: All right. Good stuff. Terry, that is all the time we have for this evening. Thank you for coming out and sharing all the great knowledge with everyone.

TERRY: Well I enjoyed it, as you can probably tell. It was great fun.

KERRY: You're very passionate about it. That's what we love to have on.

TERRY: Excellent. OK. Thanks to everybody for dropping in and joining us tonight. I'll see you all online.

KERRY: That's right. We'll be here next Tuesday again at 8pm. Looking forward to having you. Next week we're actually going to have Brendon Brazier. So we're looking forward to having that on. That's basically it. Everyone have a great night. I'll talk to you in the future.